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MACROECONOMIC INFLUENCES ON THE U.S.-JAPAN TRADE IMBALANCE
A STUDY BY VINCENT REINHART OF THE FEDERAL RESERVE BANK OF NEW YORK*

Summary

The dramatic depreciation of the dollar against the yen since September 1985 should brake the seemingly nonstop erosion of the U.S. trade deficit with Japan, but it will take more than the return of the dollar-yen rate to its 1980 position to roll back the bilateral imbalance. As Vincent Reinhart of the Federal Reserve Bank of New York demonstrates in the following article, a major cause of the widening trade gap in the 1980-85 period was the slowdown in real economic growth in Japan relative to activity in this country. His colleagues, Daniel E. Nolle and Charles Pigott, also show in an accompanying article that the surge in U.S. purchases of capital goods from Japan -- the main source of Japanese import gains during the first half of the 1980s -- was in large part the result of the composition of domestic investment spending.

Introduction

From 1980 to 1985, the U.S. merchandise trade deficit increased by $100 billion to nearly $125 billion. Both the size and rapid growth of our trade deficit are unprecedented. While the imbalance is distributed widely across major trading partners, Japan accounts for the largest share, about one-third of the total or $43 billion in 1985. Not surprisingly, therefore, the deficit

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with Japan has attracted the most attention. Economists and policy makers generally agree that the large U.S.-Japan trade imbalance is not sustainable over the long run and that it poses a serious threat to trade relations between the two countries, but there seems to be no agreement on causes of the imbalance or potential remedies for it. Indeed some have questioned whether it can be remedied at all.

One view, shared by many in the U.S. Congress, is that the bulk of the imbalance reflects explicit or implicit protectionist barriers and "unfair" trading practices in Japan. Under this view, the only viable option for the United States is to enact legislation restricting imports from Japan. In contrast, many economists believe that the U.S. trade deficit with Japan is part of a set of broader macroeconomic imbalances, which can be reduced by policies encouraging stronger economic growth in Japan and improved U.S. competitiveness. Still others have argued that Japan's bilateral and global surpluses reflect specific cultural factors, the often-noted high saving rate and a preference for home products -- that are immune to legislative action as well as to macroeconomic policy.

This article focuses on the macroeconomic forces underlying the U.S.-Japan trade balance during the 1980s. The increasing bilateral deficit coincided with significant changes in other economic trends in the two countries, including a slowing of real growth in Japan relative to the United States and a spectacular rise in the dollar against the yen and other major currencies. An assessment of the contributions of these macroeconomic developments to the bilateral trade deficit has important implications for economic policy. More specifically, if a substantial part of the deficit has been generated by changes in exchange rates and real growth, then macroeconomic policy can play an important role in reducing that deficit. On the other hand, if cultural differences or other structural factors account for Japan's trade performance, the medium-term prospects for substantial reductions of the bilateral deficit would seem to be limited.

The analysis in this article, based on a recently estimated model of U.S.-Japan trade, suggests that macroeconomic influences were responsible for most of the rise in the bilateral deficit since 1980. The dollar's marked appreciation from 1970 to early 1985 seems to account for about one-third of the increase in the U.S.-Japan trade deficit over that period. Another 40 percent is attributable to a narrowing of the U.S.-Japan growth differential, reflecting, largely, slower growth in Japan during recent years. Looking to the future, our analysis suggests that the substantial decline of the dollar against the yen and other currencies since early 1985 should reduce the bilateral imbalance over the next several years. However, without a significant pickup in Japan's real growth relative to the United States our trade deficit with Japan will most likely continue to be well above historical levels.

Influences on Trade

In several respects, the trade deficit with Japan has followed a pattern set by the overall U.S. trade imbalance. Both deficits increased moderately between 1980 and 1982 and then much more rapidly over the next three years.

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Between 1980 and 1985, the $33 billion increase in the U.S. deficit with Japan was one-third of the total rise in the deficit (Chart 1). Indeed, in dollar terms the U.S. balance with Europe has deteriorated even more.

These deficits also reflect an unprecedented growth in U.S. imports accompanied by near stagnation of exports (Chart 2). From 1970 to 1975, U.S. imports from Japan more than doubled, increasing $34 billion. The volume increase was nearly as great since the average price of these imports changed little. In the same period, U.S. exports to Japan posted only a $1.3 billion increase.

Trade developments went hand-in-hand with two other major shifts in economic trends. First, the U.S.-Japan growth differential narrowed as the rate of increase in Japanese GNP slowed to barely above that of the United States from 1980 to 1985. This represents a marked departure from the 1970s when the average annual increase in U.S. real GNP was 3.7 percent compared with 8.7 percent for Japan. The growth in Japanese domestic demand slowed even more, so that the U.S. market was expanding faster than the Japanese market. Since a part of any increase in aggregate demand is spent on foreign products, this recent shift in growth patterns would be expected to slow U.S. exports to Japan relative to imports.

Second, the dollar appreciated dramatically from the end of 1980 to the beginning of 1985, with increases of 22 percent against the yen and an average of 50 percent against other currencies (Chart 3). This appreciation, by raising the costs of U.S.-produced goods relative to foreign-produced goods, stimulated U.S. imports from Japan and depressed our exports. Since the dollar appreciated more against other currencies than it did against the yen, the cost of U.S. goods rose relative to Japanese goods and rose even more relative to the other foreign goods that compete in the Japanese market. Thus, U.S. exports to Japan were hurt by increased competition both from Japanese goods and from other foreign goods in the Japanese market.

The potential importance of these changes for the bilateral deficit is strongly suggested by economic theory as well as past experience (Table 1).[1] When Japan's real GNP grew faster than that of the United States, our bilateral exports and imports increased at roughly the same rate, and the bilateral imbalance remained within moderate bounds. When Japanese growth slowed toward the U.S. rate over 1978-79, U.S. imports from Japan accelerated and the deficit grew. These observations indicate that trade between these two countries is affected by their GNP growth rates and that Japanese imports are substantially less responsive to Japanese GNP than U.S. imports are to our GNP. Other studies of U.S.-Japan trade support these observations.[2]

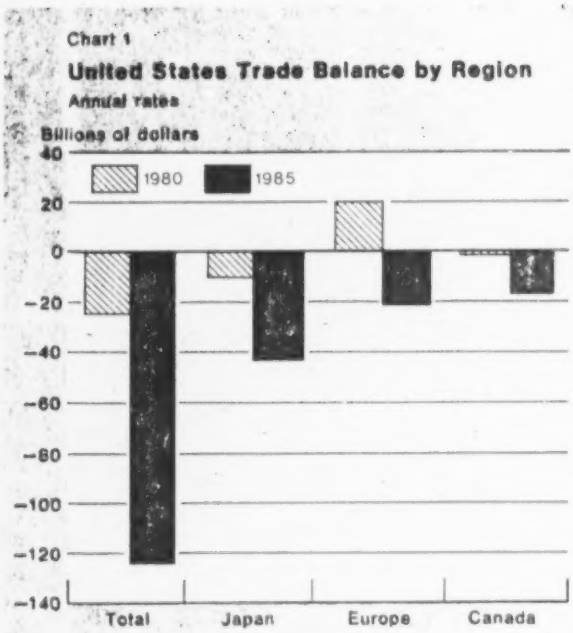
[1]For a review of the theoretical issues, see Morris Goldstein and Moshin Kahn, "Income and Price Effects in Foreign Trade," in Ronald Jones and Peter Kenen, eds., Handbook of International Economics, Volume 2 (1985).

[2]There have been many studies on the sensitivity of total imports to income (usually GNP). The average of estimates in the recent literature suggests that our imports, in volume terms, increase by 2 percent for every 1 percent rise in our real GNP. In contrast, an increase in Japan's income of 1 percent raises that country's import volume by about 1 percent. The divergence between the estimated bilateral elasticities reported later in the text is even greater.

Chart 1

United States Trade Balance by Region

Annual rates

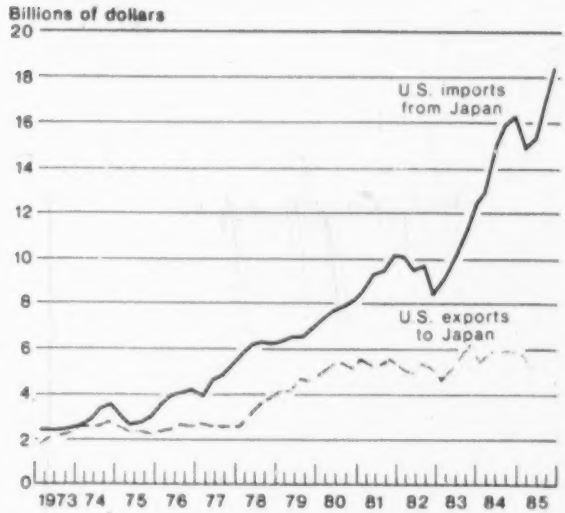


Source: United States Department of Commerce.

Chart 2

United States-Japan Trade Flows

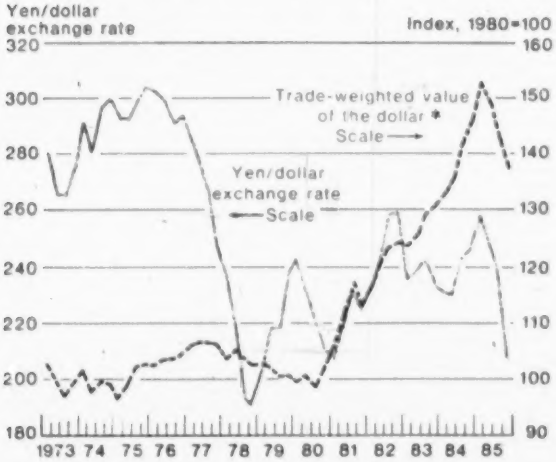
Quarterly rates



Source: United States Department of Commerce.

Chart 3

The Exchange Value of the Dollar



*Trade-weighted exchange value of the dollar vis-à-vis 11 industrial countries, excluding Japan.

Source: International Monetary Fund, International Financial Statistics.

Table 1: United States and Japan Growth and Price Trends

(average four quarter percent change over period indicated)

	1975/IV-1973/I	1978/IV-1975/IV	1982/IV-1978/IV	1985/IV-1982/IV
Japan				
Real GNP	1.5	5.0	3.9	4.5
Domestic demand	0.6	5.3	2.4	3.5
United States				
Real GNP	0.2	4.9	-0.2	4.4
Domestic demand	-0.5	5.3	0.4	5.8
U.S. export volume to Japan	-8.8	13.3	3.3	5.2
U.S. import volume from Japan	-7.5	18.4	2.4	30.5
Relative price of Japanese goods in the U.S. market	2.2	2.2	-3.1	-1.3
Relative price of U.S. goods in the Japanese market	5.5	-10.8	5.9	-6.3

Less obvious from past experience is the impact of the rising dollar on the deficit. However, the fact that growth in U.S. imports from Japan has been extraordinarily rapid since 1980 would seem to imply that the dollar has been a major influence.

The historical perspective suggests that shifts in two basic macroeconomic forces -- relative growth rates and exchange rate changes -- played a major role in the widening U.S.-Japan trade deficit since 1980; it still does not reveal anything about the extent to which the increased deficit can be attributed to those forces individually or collectively. To examine this issue more closely, we estimated a standard model explaining trade flows in terms of real growth rates, inflation, and exchange rate changes over the 1972-82 period. The volumes of U.S. exports to and imports from Japan are assumed to depend on the countries' incomes and prices of traded goods relative to domestic goods. The prices of U.S. and Japanese products as well as those of other countries are included because Japanese goods compete in the U.S. home market not only with American goods but also with the products of other countries. The prices of traded goods are themselves determined by exchange rates combined with the general level of costs within the exporting country and demand conditions within the importing country. Thus the value of the dollar against the yen as well as other currencies influences U.S.-Japan trade through its impact on relative prices. (Further details of the model and estimates are given in the box.)

Table 2 presents the model's prediction of changes in the bilateral balance between 1980 and 1985 and the relative contributions of income growth,

The Estimated Trade Model

The U.S.-Japan model is an empirical representation of simple supply and demand frameworks for two markets: U.S. trade in imports from Japan and Japanese trade in exports from the United States. We estimated the sensitivities of the volumes and prices of traded goods to incomes, prices, and exchange rates with regressions using quarterly data from 1972 to 1982. The independent variables in the export volume equation (XV) were the level of Japanese domestic demand (Y) and the price of U.S. exports to Japan relative to Japanese prices (XP/JPP). All prices were converted into dollars.*

Import volume was estimated as a function of U.S. GNP (Y), import prices from Japan relative to U.S. home prices (MP/USP), and a lagged dependent variable. The import volume equation was corrected for serial correlation (u).

Estimates are reported in Table B-1 and provide support for the proposition in the text: U.S. imports are much more sensitive to income than are U.S. exports. Equal permanent increases in income of one percentage point in the United States and Japan would raise the volume of U.S. imports from Japan by 3.2 percent but would only raise the volume of exports to Japan by 1.2 percent in the long run (Table B-2). Balanced growth in the United States and Japan results in imbalanced bilateral trade. Further, both the export and import volume equations reveal important own-price effects. In the long run a 1 percent increase in import prices will lower the volume of imports from Japan by 1.7 percent. A 1 percent increase in export prices will lower the volume of exports to Japan by 1.0 percent. It is perhaps important to point out that the differences in the estimated income and price elasticities for the two countries depend on, among other things, institutional and cultural factors. In other words, changes in those factors can alter the role of macroeconomic influences. For example, the estimated income elasticity of imports for Japan might be significantly higher if Japanese domestic markets were more open to foreign goods. This subject is, however, beyond the scope of the present study.

The dollar prices of exports (XP) and imports (MP) were related to measures of production cost, competitors' price (FORP), and domestic goods prices. The pricing equations estimated indicated that there are varieties of "pass-through" depending on the pattern of the change in exchange rates and domestic demand conditions. Since competition from other foreign countries must be considered, both the dollar's value against the yen as well as all other currencies will affect prices and volume of traded goods. The historical relationships from the 1970s used in the model suggest that a permanent 10 percent increase in the yen/dollar rate would lower the dollar price of imports by about 3 percent and raise the yen price of exports by about 3 percent in the long run. This incomplete pass-through limits the ability of exchange rates to influence trade flows. If the dollar were to appreciate 10 percent against all currencies, dollar import prices would decrease about 9 percent and yen export prices would increase about 8 percent.

*The bilateral export and import price indexes were constructed using geometrically weighted averages of U.S. export and import deflators by major end-use group. The weights were the shares of each commodity group in U.S. exports and imports from Japan.

Table B-1
Estimation Results

Export volume:	$XV = -0.24 + 0.31Y - 0.26(XP/JP) + 0.74XV_{-1}$		$R^2 = 0.91$
	(0.12) (1.92) (2.34) (8.94)		D.W. = 2.26
Export price:	$XP = 0.03 + 0.07JPFORP + 0.05JPP + 1.46XP_{-1} - 0.61XP_{-2}$		$R^2 = 1.00$
	(0.05) (1.13) (1.08) (13.46) (6.63)		D.W. = 2.02
Import volume:	$MV = -8.13 + 1.55Y - 0.83(MP/USP) + 0.51MV_{-1} + 0.32u$		$R^2 = 0.94$
	(3.29) (3.81) (2.13) (4.52) (1.92)		D.W. = 1.84
Import price:	$MP = 1.62 + 0.06USP + 0.22USFORP + 0.11JPP + 0.61MP_{-1}$		$R^2 = 1.00$
	(6.46) (0.94) (3.04) (3.12) (8.79)		D.W. = 1.93

Table B-2
Long-Run Bilateral Trade Elasticities

The impact of a permanent 1 percent change in:	U.S. Exports to Japan		U.S. Imports from Japan	
	Volume	Price	Volume	Price
Home country income	1.2	n.a.	3.2	n.a.
Traded goods price	-1.0	n.a.	-1.7	n.a.
Foreign competitors' price	0	0.5	0	0.6
Producers' cost	n.a.	0	n.a.	0.3
Domestic goods' price	n.a.	0.3	n.a.	0.2

exchange rate change, and inflation.[3] The main point that emerges from Table 2 is that developments in macroeconomic factors are, in large part, responsible for the deterioration of the bilateral trade position, accounting for $27 billion of the $33 billion recorded increase in the deficit. The unexplained portion is therefore small, though obviously not insignificant. The dollar value of both bilateral exports and imports increased more than would be predicted from past relationships, but increases in U.S. exports to Japan exceed predicted values by a considerably smaller margin. This relative success in explaining exports indicates that the widening of the deficit over and above what macroeconomic variables predict is not the result of special Japanese import practices.[4]

Table 2: The Change in the United States-Japan Trade Balance, 1980-85

(in billions of dollars, annual rates)

Change	Nominal exports	Nominal imports	Nominal balance
Actual	1.3	34.3	-33.0
Predicted	-1.2	26.3	-27.5
Of which attributed to:			
Income growth	2.7	16.2	-13.5
Exchange rate change	-4.1	8.2	-12.3
Other*	0.2	1.9	-1.7
Unexplained	2.5	8.0	-5.5

*Includes the influences of inflation in the United States, Japan, and other foreign countries.

Of those macroeconomic forces, the rise in the dollar accounted for a significant portion of the increases in the bilateral imbalances. If the dollar exchange rate had remained unchanged from its 1980 level against the yen and other currencies, the 1985 deficit would have been about $12 billion lower; that is, about one-third of the increase in the deficit is attributable to exchange rate movements. This calculation takes into account only the direct effect of the exchange rate on prices of traded goods, and assumes away any indirect effect on trade through changes in incomes or other macroeconomic variables. Moreover, with the dollar exchange rate fixed, macroeconomic developments, including real growth rates, would probably have been different from

[3]This was a dynamic simulation of the model. Wherever lagged endogenous values were called for the model's own forecasts were used.

[4]On the other hand, as shown in the next article by Nolle and Pigott, nonmacroeconomic forces have influenced U.S. imports from Japan in recent years. This may account for the relatively large prediction error in our import estimates over 1980-85.

what actually occurred, and as a result, trade flows and even the balance might have evolved along different lines. Abstracting from these difficulties, our results suggest that even if the dollar had not appreciated since 1980, other macroeconomic forces would likely have driven the bilateral deficit to over $25 billion by 1985.

The bilateral deficit would have widened due to the pattern of U.S.-Japan real growth. The increases in the two countries' GNPs would have led to a nearly $14 billion worsening in the deficit due exclusively to the effects of income on the volumes of trade. These effects are concentrated on the import side. Income growth influences the demand for foreign goods directly; when income grows, so does the demand for foreign goods. In contrast, exchange rate changes affect trade volumes more indirectly through first altering the prices of traded goods. On the basis of the estimated model, U.S. imports from Japan are almost three times as sensitive to income as U.S. exports to Japan. This differential sensitivity to income implies that Japan's real income must grow at nearly three times the U.S. rate to maintain balanced increases in export and import volume (absent any changes in relative prices). These changes in income directly affect the volumes of exports and imports but not the prices of traded goods.

By contrast, the exchange rate influences both the volumes and prices of traded goods. For example, if the dollar appreciates, the dollar cost of foreign goods declines. Typically, some fraction of these lower costs will be passed-through to lower prices, which then stimulates import demand. The exchange rate effect on price works in the opposite direction of the price effect on volume, so the impact of a change in the dollar on the nominal value of imports is less than on the volume of imports.[5] On the export side, the effect of an appreciating dollar is to lower the dollar price of exports, but not enough to prevent them from becoming more expensive relative to Japanese home goods.[6] Export volume declines and the price effect reinforces the volume effect. Exchange rates, therefore, have a bigger impact on nominal exports than on real exports. As Table 3 shows, about 80 percent of the predicted change in the real balance can be accounted for by dollar movements, making them even more important in explaining real trade flows than nominal trade flows.

Medium-Term Prospects For The Trade Balance

We can use this historical perspective on the relationship between the deficit and its key macroeconomic determinants to suggest how the balance will evolve over the next few years. Since one of the trends that greatly influenced the deterioration of the balance from 1980 to 1985 has substantially

[5]Indeed, the initial impact of an exchange rate depreciation may be to increase prices by proportionally more than volume declines; consequently, imports in nominal terms increase. Over time, the volume declines dominate and the nominal imports decline. This reversal in the path of imports is known as the "J-curve."

[6]Put another way, an appreciating dollar raises the yen costs of exports. If the pass-through to a higher yen price is less than complete (which is likely), then the dollar price of exports will decline.

Table 3: The Change in the United States-Japan Trade Balance, 1980-85

(in billions of 1980 dollars, annual rates)

Change	Volume of exports	Volume of imports	Real Balance
Actual	2.0	31.4	-29.4
Predicted	-1.9	24.7	-26.6
Of which attributed to:			
Income growth	3.0	15.4	-12.4
Exchange rate change	-2.1	17.6	-19.7
Other*	-2.8	-8.3	5.5
Unexplained	3.9	6.7	-2.8

*Includes the influences of inflation in the United States, Japan, and other foreign countries.

reversed itself in 1985 and into 1986, we will explore whether the depreciation of the dollar during the last year will be sufficient to restrain any further deterioration in the deficit.

In the first quarter of 1986 the yen/dollar rate was 27 percent below its year-earlier level. There were similar, if smaller, declines against the other major currencies. Our historical perspective suggests that such a large movement in U.S. relative to Japanese costs should have a significant impact on trade flows. Whether the trade balance actually improves will depend not only on the exchange rate effects but also on developments in other variables, especially the pattern of income growth in the two countries.

The direct effect of income on the bilateral balance would likely, by itself, lead to a widening deficit for two reasons. First, since U.S. imports from Japan are more income-sensitive than U.S. exports to Japan, equal rates of growth in export and import volumes require that Japanese income growth be almost three times that of the United States. Second, given the present deficit, U.S. exports to Japan must grow at a proportionately faster rate than imports simply to prevent further deterioration.[7]

The model can be used to assess the relative contributions of exchange rate change and income growth to the future course of the deficit. Assuming that income in both countries grows close to long range trend (3.0 and 4.5 percent for the United States and Japan, respectively, the behavioral relationships embedded in the trade model suggest that a fall in the yen/dollar rate to 180 (along with the dollar's general decline against all other currencies) is

[7]In 1984 import volume was 2.2 times export volume. If the volume of imports were to remain fixed at the 1984 level forever and export volume were to grow at its 15 year historical average of 5.4 percent per year, volumes of trade would not balance until the year 2004.

enough to lower the 1988 bilateral balance by $12 billion from what it would have been without any exchange rate change. This only considers the direct effects of alternative exchange rate paths on trade flows. If the exchange rate were different that would obviously influence the paths of domestic income and prices. These macroeconomic linkages are not taken into account in our comparison. More favorable assumptions about the pass-through and the price sensitivity of trade volume would, at most, mean another $3 to $5 billion reduction of the deficit from what it would have been in 1988. For the bilateral balance to improve substantially, the growth in real domestic demand in Japan would have to accelerate or relative prices would have to undergo further changes.

Conclusion

The sharp rise in our trade deficit with Japan during 1970-85 seems to have resulted largely from shifts in key macroeconomic factors. The analysis in this article indicates that about four-fifths of the increase in the deficit can be attributed to changes in exchange rates and in the relative patterns of real growth and prices in the two countries. The rise of the dollar played a major role in aggravating the bilateral trade imbalance, but the deficit would have widened substantially even if exchange rates had remained at their end-1980 levels. Slower income growth in Japan led to a narrowing of the growth differential and accounted for about 40 percent of the widening of the trade imbalance.

Since macroeconomic variables can explain most of the deterioration in our trade position with Japan from 1980 to 1985, the perception that "unfair" trading practices or protectionism in that country has contributed substantially to the increase in the deficit appears to be unfounded. Even granting that the initial bilateral trade gap in 1980 may have been due, largely, to the relatively closed nature of Japanese markets or other structural forces, our analysis suggests that the bulk of the present U.S.-Japan trade imbalance reflects macroeconomic factors. It would seem more appropriate, therefore, to look for macroeconomic solutions to narrow the trade imbalance between the two countries.

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THE CHANGING COMMODITY COMPOSITION OF U.S. IMPORTS FROM JAPAN

A STUDY BY DANIEL E. NOLLE AND CHARLES PIGOTT
OF THE FEDERAL RESERVE BANK OF NEW YORK*

Introduction

The last several years have brought a surge in U.S. imports from all areas of the world. Especially rapid has been the growth in Japan's sales to

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the United States, which nearly doubled between 1980 and 1985 and now amount to one-fifth of our total imports (Chart 1).

Magnifying the impact of U.S. purchases from Japan is their high and increasing concentration in key manufacturing sectors previously dominated by domestic producers. Nearly one in five new cars sold domestically is produced in Japan. Japanese capital goods, led by personal computers and other high technology equipment, have been the fastest growing component of imports since 1980. Indeed, last year nearly 7 percent of all investment equipment expenditures by U.S. businesses went to Japanese exporters.

As with our imports generally, purchases from Japan have been boosted substantially by the dollar's rise over 1980-85; presumably, the dollar's recent decline should slow their growth considerably. But whether Japan's most impressive gains in the United States will be reversed is less clear. Quality and cost-efficiency, and rapidly growing U.S. domestic demand, have also contributed to Japanese successes. These factors, together with the dollar's movements, will ultimately determine whether Japan's role in U.S. markets diminishes or continues to increase.

This article examines recent trends in U.S. imports from Japan for the major commodity groups, focusing on capital goods and autos. After identifying the major shifts among the categories since 1980, we analyze the reasons for the changes, and then assess their implications for Japan's future position in U.S. markets. U.S. purchases of Japanese capital goods have grown especially rapidly and their share, both of our domestic market and of total imports from Japan, has increased. The dollar's appreciation over 1980-85, relatively rapid U.S. real demand growth, and a change in the composition of domestic investment spending appear to be largely responsible for this shift. Our analysis suggests that despite the dollar's fall, U.S. producers will continue to face stiff competition from Japan, and that Japan's share of our total imports is likely to remain high by historical standards.

Commodity Composition

Considerable diversity underlies the remarkable growth of Japanese exports to the United States since 1980: not all categories have fared equally well. Indeed, the commodity composition of our imports from Japan has changed markedly in recent years. These changes reveal that Japan's success in U.S. markets has been less pervasive than is often supposed.

As shown in Table 1, imports of consumer goods (except autos) and industrial supplies from Japan have grown in line with our imports of these products from other areas. Japan's share of total U.S. imports in these categories has changed little since 1980. Our imports of these products from Japan have grown faster than demands for domestic products but so have imports from other areas.

More striking have been the divergent performances since 1980 of the two leading components of U.S. imports from Japan, capital goods and autos. Their current positions also represent a reversal of the 1970s pattern. During most of the 1970s and early 1980s, autos were the dominant U.S. import from Japan, accounting for nearly 40 percent of the total; capital goods were second in importance, but they only moderately exceeded consumer goods and industrial

supplies shipments. Spurred by strengthening demand for small cars due to rising gasoline prices, Japan's share of total U.S. auto imports rose rapidly during the mid- and late 1970s, as did its share of the overall U.S. market (Chart 2). By the end of 1980, just before the voluntary export restraint (VER) was imposed, Japanese producers had garnered one-fifth of the U.S. market for new cars.

Since 1980, however, growth in Japanese auto exports to the United States has slowed considerably, and their share of total auto imports has dropped by five percentage points.[1] But a surge in U.S. purchases of capital goods from Japan has more than compensated for the sluggishness in autos. Imports of Japanese capital goods have grown nearly five times faster than domestic demand and 50 percent faster than overall capital goods imports. As a result, capital goods now challenge autos as Japan's leading export to the United States. Japanese producers' share of the domestic market has more than doubled, from 3 percent of business investment equipment expenditures in 1980 to 7 percent in 1985.

The rapid growth of Japanese capital goods imports is largely responsible, in an accounting sense, for the increase in Japan's share of total U.S. nonpetroleum imports over the last five years from 19 percent in 1980 to 24 percent in 1985. This increase would have been even greater if the Japanese share of auto imports had not declined.[2] That capital goods have been the fastest growing component of total imports only adds to the significance of Japan's gains; Japanese producers have strengthened their position in one of the most buoyant sectors of our market.

Determining Factors

Our analysis suggests that the performance of Japanese exports is due not only to macroeconomic trends, such as the dollar's appreciation, but to other factors as well. For example, the most obvious explanation for the relatively slow growth of U.S. auto imports from Japan lies with the VER imposed in 1981. Because of the VER, sales of Japanese autos in this country reportedly have fallen short of demand in recent years.

Capital goods imports from Japan and elsewhere were stimulated by U.S. investment growth during the 1983-85 business expansion,[3] as well as the boost to foreign competitiveness provided by the dollar's appreciation. However, because the dollar rose less against the yen than other major currencies,

[1]Auto imports from Japan grew more slowly in real terms than total auto imports and U.S. demand over 1980-84, but rebounded in 1985 following an increase in the VER quota. The drop in Japan's share of auto imports partly reflects the slower growth in the price deflator for Japanese autos compared with the deflator for auto imports as a whole.

[2]Note, however, that because of the rapid growth of capital goods, Japan's share of total imports would have increased over 1980-85 even if its shares of individual categories had remained fixed at their 1980 levels.

[3]Nearly three-quarters of the increase in capital goods imports over 1980-85 occurred during the recovery from the 1982 recession.

Table 1: Import Growth by Major Categories

(in percent; trade data for 1985 are preliminary)

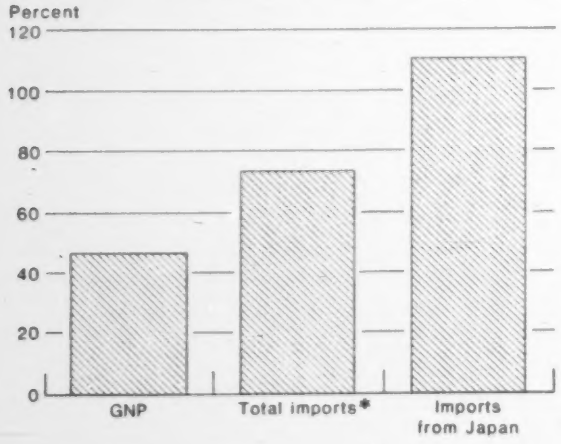
	Automotive goods*	Capital goods	Consumer goods	Industrial supplies**
1980-85 real growth:				
U.S. imports from all areas	10	15	14	6
Imports from Japan***	10	24	16	7
Domestic demand	8	5	3	4
Japan's share of U.S. imports:				
1976	29	26	19	13
1980	42	24	18	11
1985	37	33	20	11
Memo: Composition of total U.S. imports from Japan:				
1980	37	23	20	17
1985	36	32	20	10

*Includes auto parts.
**Nonpetroleum supplies.
***Separate import-price indexes for U.S. purchases from Japan are not available. Real growth of these imports was calculated using measures of Japanese production costs, converted to dollars at prevailing exchange rates, as deflators of nominal imports in each category.

Chart 1

Growth of United States Imports and GNP

Cumulative 1980-85 growth in current dollars

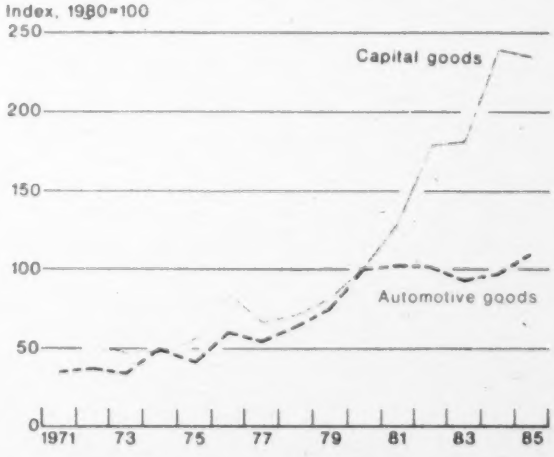


*Nonpetroleum imports.

Source: United States Department of Commerce.

Chart 2

Japan's Penetration of United States Markets*



*Index of the ratio of U.S. imports to domestic demand (in the relevant sector) in constant dollars.

Source: United States Department of Commerce.

Japanese exporters may have benefited less than their European competitors. Probably more favorable to Japan has been the shift in U.S. investment spending toward office and store equipment, primarily small computers and copiers. This equipment accounted for 26 percent of producers' durable expenditures in 1984, up from 16 percent in 1980 and less than 10 percent in the mid-1970s. Japan has benefited significantly from this shift because it is the major foreign producer and exporter of this type of capital equipment.[4]

The relative importance of these factors is of special interest because some of the conditions spurring Japan's gains into the United States are now changing. The most obvious is the dollar's depreciation, an average of 20 percent from its 1985 peak, and to more than 25 percent below its 1980 level against the yen. But other conditions that have favored Japanese exports may continue. New developments that could further enhance the position of Japanese producers, such as relaxation of the VER on autos, cannot be ruled out. Thus the extent to which Japan's advances in our markets will continue, or recede, is not obvious.

To make this assessment, we have used a statistical analysis of the determinants of U.S. imports from Japan during the 1970s to estimate the major contributors to their growth over the 1980s. This analysis also provides a basis for judging the outlook for future competition between the two countries.

As explained further in the box, imports in each category are largely determined by several factors: domestic demand for all products of that type; production costs in Japan (and possibly other countries) compared with those in the United States; exchange rates; and several industry-specific factors. For example, an increase in U.S. producers' durable equipment spending should raise demand for Japanese capital goods; increases in Japanese production costs or dollar depreciation should lower imports by raising selling prices or reducing the yen profits to Japanese exporters. In addition, the share of domestic investment in office/store equipment may significantly affect U.S. demand for Japanese capital goods, while higher gasoline prices should favor demand for fuel-efficient Japanese cars.

Table 2 indicates the expected growth of each type of Japanese import over 1980-84 based on these factors.[5] The expectations are very close to the actual increases recorded for capital goods and industrial supplies. U.S. auto imports from Japan grew much more slowly than past relations would suggest, probably because the VER kept actual purchases below the level of demand.

[4]Office and related equipment accounted for about one-third of total U.S. capital goods imports in 1985, compared with 10 percent in 1980. Japan now supplies 45 percent of these imports, with Asian developing countries supplying another 30 percent. Imports of this equipment from Asian developing nations have grown more rapidly than imports from Japan. European and Canadian capital goods exports are heavily concentrated in industrial machinery.

[5]Though final complete data for 1985 were not available, preliminary figures indicate that they would not change our conclusions.

How Different Are U.S. Imports From Japan?

The exceptional growth in U.S. imports from Japan might suggest that there is something unusual about their determinants. However, our statistical analysis of individual categories implies that U.S. demands for Japanese products are largely unexplainable in terms of factors governing comparable U.S. imports from other areas. Much of the distinctive behavior of aggregate imports from Japan is attributable to their commodity composition, as well as the commodity composition of U.S. demand.

As with purchases from other countries, imports of particular Japanese products (e.g., autos) are heavily influenced by two sets of factors: domestic demand for products of the given type (i.e., cars in general);* and Japanese exporters' production costs compared to those of U.S. and foreign competitors. Costs determine the price at which a supplier can sell and the profit earned. A rise in Japanese costs is apt to lower our imports, either by raising prices or reducing the exporter's profit. Exchange rates affect imports by altering their cost: a rise in the dollar against the yen, for example, lowers the cost, expressed in dollars, of Japanese exports relative to their U.S. competitors. In many cases, imports from European and other foreign countries will compete with Japanese products, and if so, their costs and exchange rates may also affect our imports from Japan (see Appendix).

Other industry-specific factors also seem to have affected our imports significantly. Increased capacity utilization in our domestic durable goods industries seems to encourage capital goods purchases from Japan, probably by slowing deliveries from U.S. competitors. The share of our investment spending going to office/store equipment is positively related to demand for Japanese capital goods, as is the relative price of gasoline to demand for Japanese autos (see table).

The figures in the table confirm that the response of imports from Japan to demand and exchange rate changes is generally similar to that of imports from other areas. Except for industrial supplies, domestic demand growth is associated with more than proportionate increases in imports. This implies that growth itself tends to raise the share of Japanese exports in the U.S. market (although, except for consumer goods, the increase is fairly modest). This pattern is not unique to Japanese products, however. Industrial nations' imports generally seem to respond more than proportionately to their income growth, helping to explain why import-to-GNP ratios have been rising over time. Indeed, the Japanese responses to demand shown in the table are, in general, fairly close to those derived in a recent study by Christopher Rude** of total U.S. imports in each major category.

Imports from Japan also seem to be about as responsive to exchange rates as other comparable U.S. imports.*** Capital goods imports appear fairly sensitive to changes in the dollar, even though its appreciation seems to have played only a modest role in import growth over 1980-84. The main reason is that strong demand growth dominated the impact of the more modest change in the yen/dollar exchange rate. Auto imports from Japan appear insensitive to exchange rates, but the Rude study suggests that this is the case for U.S. auto imports generally. This insensitivity may also be a statistical illusion. Because the quality of Japanese autos generally has been rising, the measures used in the analysis may overstate true costs and hence mask their influence on imports, as well as the effect of exchange rates. The relative price of gasoline does seem to have been a major influence on our demand for Japanese autos during the 1970s, substantially accounting for their rising share of the domestic market. However, because energy prices since have changed little, this factor appears to have been much less important during the first half of the 1980s.

Finally, our analysis suggests a reason for the especially rapid growth of imports from Japan during U.S. economic recoveries.**** Business investment, and hence demand for capital goods, are procyclical; that is, they normally grow faster than GNP during business-cycle expansions. Capital goods imports are also procyclical, more so than other major import categories. On this basis, the relatively high capital goods share of Japan's exports to the United States helps explain their more rapid growth than overall U.S. imports during recent expansions. Note, however, that investment and demand for capital goods typically slow substantially as the economy approaches full employment and GNP converges toward its "potential" growth path. For this reason, imports from Japan should not be expected to outstrip our GNP indefinitely.

*Demand is measured by producers' durables spending for the capital goods equation, consumer spending for consumer goods, domestic auto expenditures for autos, and industrial production for industrial supplies.

**Christopher Rude, "The Role of the Dollar in the Changing Composition of U.S. Trade, 1980-84," unpublished working paper, Federal Reserve Bank of New York (April 1986).

***The aggregate (volume) elasticity of imports from Japan with respect to changes in the dollar is 1.0; for imports excluding autos it is 1.6.

****This pattern was pronounced during the 1976-78 and 1983-85 expansions, when imports from Japan grew much more rapidly than total imports and U.S. GNP.

Response of Real Imports from Japan to Demand and Exchange Rate Changes
(in percent)

Import Response	Capital goods	Automotive goods	Consumer goods	Industrial supplies
One percent increase in demand	1.3	1.3	1.9	0.8
One percent rise in dollar versus:				
All currencies	1.5	0	2.2	1.0
Yen only	1.5	0	0.7	2.2
One percent increase in office equipment share of U.S. investment	3.3	n.a.	n.a.	n.a.
One percent rise in gasoline price	n.a.	0.9	n.a.	n.a.

Table 2: Sources of the Growth in Imports from Japan, 1980-84

(changes in billions of 1982 dollars)

Sources	Capital goods	Automotive goods	Consumer goods	Industrial supplies
Actual*	11.7	4.2	4.9	1.9
Predicted	12.0	9.3	2.7	1.7
Of which attributed to:				
Dollar appreciation	2.9	1.0	3.6	1.1
U.S. activity	4.7	7.6	1.7	0.9
Office equipment demand**	4.8	***	***	***
Other	-0.4	0.7	-2.6	-0.3
Unexplained	-0.3	-5.1	2.2	0.2
Memo: Cumulative growth 1980-84 (in percent)				
Actual	176	34	83	37
Predicted	180	73	47	29

*U.S. imports from Japan deflated by Japanese costs of production expressed in 1982 prices.
**Measured by the share of office equipment in U.S. producers' durables expenditures, and applicable for capital goods only.
***Not included.

Table 2 also suggests that the dollar's appreciation has contributed significantly to the overall growth of imports from Japan, particularly in consumer goods and industrial supplies where it seems to have been the single most important factor. But the dollar appears to have had less influence on the growth in demand for Japanese capital goods and autos.

Instead, the overall growth and composition of U.S. investment spending appear to account for nearly 80 percent of the exceptional increase in capital goods imports from Japan. Half of this is attributable to the ten percentage point increase in the office/store equipment share of producers' durable equipment spending. In effect, Japan's increased share of our capital goods market largely reflects its concentration in the most rapidly growing component.

In autos as well, domestic activity has been the dominant contributor to demand for Japanese imports.[6] In fact, the figures in Table 2 imply that imports of Japanese autos would have grown nearly twice as fast as actually recorded over 1980-84 if the VER had not been imposed. Although this amount may

[6]Auto imports from Japan seem relatively insensitive to exchange rate changes, although for reasons discussed in the box, this may be understated.

be overstated,[7] it seems likely that Japanese auto producers would have penetrated significantly further into the U.S. market had it been free from these restraints.

Prospects

Economic conditions prevailing over the last several years have greatly favored U.S. demand for Japanese exports at the expense of domestic products. With the decline in the dollar, falling gasoline prices, and generally slower U.S. real growth, these conditions are now less favorable. Accordingly, growth of imports from Japan should slow significantly over the next several years. But whether these changes will be sufficient to roll back Japanese gains in our markets since 1980 is doubtful. One reason is that the share of investment spending going to office equipment is likely to remain high;[8] another is that decelerating demand for Japanese autos may not be reflected in imports.

Table 3 gives a projection of the position Japanese exporters might hold in U.S. markets after the fall in the dollar has fully affected demand. This should not be taken as a forecast but as an illustration of how recent changes in U.S. economic conditions could affect our imports from Japan.

As might be expected, the dollar's decline should curtail the rapid growth of imports from Japan of the last several years. Indeed, these imports probably will fall in real terms over the next one or two years, in sharp contrast to the first half of this decade. Nonetheless, the projection suggests that roughly 40 percent of Japanese gains since 1980 in the capital goods market will persist, primarily because the composition of domestic investment spending seems likely to continue to favor Japanese producers.

Interestingly, because of the changed energy situation, Japan's share of the U.S. auto market may shift little even if the VER is removed. The reason is that falling gasoline prices could lower demand for Japanese autos nearly back to the level permitted by the quota, largely removing its effective constraint on imports for several years.[9]

[7]About half of the residual can be attributed to the VER assuming that Japan's share of auto imports would have remained at the 1980 level in its absence. Allowing for some further increase in Japan's share suggests that perhaps three-quarters of the difference between actual and predicted growth is attributable to the VER. The rising cost of gasoline was a major factor behind the growth of Japanese auto imports after 1973 but became much less important during the 1980s.

[8]In part, spending on office equipment reflects an increased concentration of investment services, including wholesale and retail trade. This pattern should persist, at least to a large extent, over the next several years.

[9]The Table 3 projections assume that three-quarters of the difference between actual and predicted growth in imports of Japanese autos over 1980-84 was due to the VER. If all of the difference is allocated to the quota, its removal would allow a somewhat greater increase in Japan's market share.

Table 3: Projected Medium-Term Outlook for Imports from Japan*

(in percent)

	Capital goods	Autos** With VER	Autos** Without VER	Consumer goods	Industrial supplies
Ratio of real imports to real domestic demand (index, 1980 = 100)					
1985	230	110	n.a.	180	115
Projected	145	110	115	105	75
Memo: Projected average real import growth over the first two years of the projection horizon	-12	3	5	-13	-14

*Projected positions after several years assuming: U.S. real demand grows at 3 to 4 percent; the dollar stays roughly 25 percent below its 1985 average against the yen and 10 percent below its 1985 average against other foreign currencies; the relative price of gasoline stays about 30 percent below its 1985 average; and the office/store equipment share of producers' durables spending is unchanged from the 1985 level.

**Projection with VER assumes imports and domestic demand grow at the same rate. Projection without VER assumes that three-quarters of the 1980-84 residual growth given in Table 2 is restored over the projection horizon.

Overall, then, the U.S. propensity to buy Japanese products is likely to remain high. For U.S. producers, this means that competition with Japan in domestic markets (as well as in foreign markets) will continue to be fierce. Japanese producers will probably maintain their present share of the U.S. auto market for the foreseeable future -- and could make further inroads if oil and gasoline prices recover.. And unless the dollar declines further, or the office equipment share of investment drops significantly, Japanese exporters are likely to capture at least 5 percent of domestic capital goods expenditures, more than double their 1980 share.

Trade Balance

Finally, the gains made by Japanese exporters also have implications for the U.S. trade deficit with Japan. Restoration of balance in U.S. trade would bring a substantial decline in our nearly $50 billion deficit with Japan.[10] Nonetheless, the commodity composition of the two countries' overall trade means that Japan's share of U.S. imports is likely to continue to exceed the

[10]See the preceding article.

share it takes of our exports.[11] In effect, even when its overall trade is in balance, the United States is likely to have a trade deficit with Japan -- although a much smaller one than at present.

Substantially because of its inroads in capital goods, Japan's share of total U.S. imports is now five percentage points higher than in 1980. Our analysis suggests that much of this gain will persist. Growth in imports from Japan should decline over the next two to three years, but so should import growth from other areas. The likely composition of investment spending is apt to prevent Japan's share of U.S. capital goods imports from falling substantially below its present level of one-third; and Japan's share of auto imports could as easily rise as fall. On this basis, Japan's share of our overall imports could remain significantly higher than in the late 1970s, perhaps by as much as two to three percentage points or $5 to $8 billion in 1985 prices.[12] If so, restoration of overall balance to U.S. trade is likely to leave a significant deficit with Japan.

Conclusion

By past standards, U.S. imports from Japan have grown very rapidly during the 1980s. The United States now buys almost as much from Japan as it does from Canada, its primary trading partner. To many observers, this performance reflects a combination of Japanese production skills and determination to export that will not be easily offset by the dollar's depreciation.

Our analysis has shown, however, that Japanese producers have not been equally successful in U.S. markets. Capital goods is the only major category where imports from Japan have grown more rapidly than those from other areas. But this growth has been so strong that Japan's aggregate share of U.S. imports has increased -- despite the voluntary export restraint on Japanese autos.

Japanese inroads into our markets also appear to be due at least as much to economic conditions in the United States as in Japan. Because of the overall composition of its production, Japan was well-positioned to benefit from the surge in U.S. imports during the 1980s that resulted from our strong domestic demand growth and the dollar's appreciation. Together with a shift in the composition of U.S. investment toward office equipment, these macroeconomic trends largely account for the very rapid growth of Japanese capital goods exports to the United States.

As a result of the dollar's sharp decline, Japanese exports to the United States are apt to grow little, if at all, in nominal terms over the next

[11]Japan's imports are dominated by raw materials while its exports are primarily manufactures. For this reason, Japan typically has trade deficits with LDC exporters of raw materials and trade surpluses with the industrial countries. Furthermore, the commodity composition of U.S. imports is similar to that of Japan's exports; autos and capital goods together account for two-thirds of Japan's exports, and nearly half of U.S. (nonpetroleum) imports.

[12]The estimate reflects the increased importance of autos and capital goods in total U.S. imports, as well as Japan's increased share of capital goods.

two years, and should decline in real terms. The result should be a significant improvement in the U.S. trade deficit with Japan. Nonetheless, as long as the composition of U.S. investment is favorable to Japanese capital goods exporters, Japan's share of our imports probably will remain high by pre-1980 standards.

* * * * * *

APPENDIX: The Statistical Model

The statistical model includes equations for imports from Japan for capital goods, autos (including parts), consumer goods, and (nonpetroleum) industrial supplies. The form is log-linear, with the dependent variable the value of imports from Japan divided by an index of Japanese production cost converted to dollars at the prevailing exchange rate.* The predetermined variables (expressed in logarithms) are U.S. real activity in the relevant category,** the ratio of U.S. to Japanese production costs, the ratio of third-country to Japanese production costs,*** and industry-specific variables. Capacity utilization in durable-goods industries and the ratio of office/store equipment spending to total producers' durables expenditures are the industry-specific variables in the capital goods equations; an index of the ratio of gasoline prices to the CPI was included in the autos equation. The equations were estimated using quarterly data over 1971-80.

*Import data are from United States Commerce Department published sources. Japanese production costs were measured by the export unit value index for autos, and by wholesale price indexes for the other categories.

**The demand variables are producers' durables spending, the value of consumer auto purchases, consumption, and industrial production -- all expressed in constant (1972) dollars.

***This variable was not included in the autos equation because of lack of data; it was dropped from the capital goods equation because of a statistically insignificant coefficient.

(See table on page 21)

U.S. Imports from Japan by Major Commodity Group: Estimated Equations*

(t-statistics in parentheses)

Independent variables	Dependent Variables: Capital goods	Automotive goods	Consumer goods	Industrial supplies
U.S. cost/Japan cost**	1.46 (4.06)	0.03 (0.09)	2.17 (2.45)	1.03 (2.29)
Third countries cost/Japan cost**	*** ***	*** ***	-1.46 (-1.90)	1.17 (2.13)
U.S. activity	1.26 (3.21)	1.27 (4.47)	1.86 (2.16)	0.84 (1.23)
Capacity utilization in U.S. durable goods	0.01 (1.17)	*** ***	*** ***	*** ***
Share of office equipment in U.S. producers' durables	0.03 (2.36)	*** ***	*** ***	*** ***
Gasoline price index	*** ***	0.90 (7.03)	*** ***	*** ***
Constant	-13.74 (-2.99)	-10.99 (-2.44)	-19.16 (-1.63)	-7.17 (-1.22)
Autocorrelation coefficient	0.68 (11.35)	0.52 (3.67)	0.73 (7.13)	0.60 (4.65)
F statistic	24.32	27.31	1.94	5.65
R^2 (adjusted)	0.97	0.93	0.78	0.64
Regression standard error	0.07	0.11	0.09	0.11

*All variables were expressed in natural logarithms, except capacity utilization in U.S. durable goods industries and the share of office equipment in U.S. producers' durables.

**Estimates refer to the total (sum of current and lagged) impact. A second order polynomial distributed lag (4-6 quarters) was used.

***Not included.